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CONTENTS:

- A Study of the Rocky Mountain Species of the Multiflora Section
of Aster. *R. A. Nelson* 323
- Recent Discoveries in the Newfoundland Flora (continued).
M. L. Fernald 327
- On the Distribution of *Sorocarpus*. *R. E. Schuh* 347
- Notes on Rocky Mountain Plants. *E. H. Kelso* 347
- Heterochromism in *Arctostaphylos Uva-ursi*, var. *coactilis*.
M. L. Fernald 348

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ANTENNARIA COLUMNARIS, $\times 1$; insert $\times 2$.

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A STUDY OF THE ROCKY MOUNTAIN SPECIES OF THE MULTIFLORI SECTION OF ASTER¹

RUTH ASHTON NELSON

No doubt it will be considered a very bold venture for an inexperienced student to make her *début* in botanical literature with a paper on a group of the genus *Aster* which has been the despair of many more experienced and wiser botanists than she. The results here published are due to the stimuli of repeated exasperations when attempting to place correctly members of this group which come frequently to hand for determination. No doubt the appearance of more discussion in this much discussed and too much named group, will stimulate exasperation among some workers but after several weeks of study the author feels that her results will bear publishing and sincerely hopes that they may be of some value to any who may be bewildered among the *multiflora-commutati* section of *Aster*, as she has been.

This group falls naturally into two divisions.

First, those plants that for years have been called *Aster multiflorus* Ait., but for which we must now accept the name *Aster ericoides* L., as has been pointed out by Mr. K. K. Mackenzie² and Dr. S. F. Blake.³ This plant is characterized by an excurrent stem from which branches ascend and recurve bearing numerous heads in more or less secund fashion. The heads are rather uniformly small in typical material from eastern states but in our western plants tend to be larger and to show much variation in size. The involucre of these heads are well imbricated with bracts in 3-5 series. In general this

¹ Published with aid to RHODORA from the National Academy of Sciences.

² RHODORA 28: 65. 1926.

³ RHODORA 32: 136. 1930.

is a tall plant ranging in height from 1 to 6 or 7 feet and often widely branched and bushy. Here the caespitose rootstocks often result in the formation of clumps each made up of several stems. Although *A. ericoides* becomes much more variable in its western range, as do many other species, nevertheless it always shows in some degree the characters noted above. Several specimens are at hand of Rocky Mountain plants which can not be distinguished from those of Iowa and Illinois. After long consideration it is impossible to recognize the various segregates which have been made and it seems wisest to call them all forms of a variable species.

Second, is the group separated by Dr. Gray under the name *A. commutatus*, and its allies, which has two characters which amply distinguish it from *A. ericoides*. In the first place its usually solitary heads are borne at the ends of leafy branches which are not recurved. Here the excurrent habit of the main stem is not so conspicuous and is never combined with the ascending, recurved, secund branches of the latter. In the second place, instead of forming clumps these plants form "loose but somewhat extensive masses through a system of branching rhizomes," as is very well explained by Dr. Greene in his original description of *A. adsurgens*. This character has been repeatedly observed by the author as exhibited by *A. commutatus* in the vicinity of Estes Park, Colorado. Within the *commutati* group the character of the bracts has been considered the fundamental distinguishing point, and that of the pubescence of stems and bracts of second importance.

Variation is prevalent, and numerous intermediates occur exhibiting the parent characters in all possible combinations, but here it is possible to separate at least three species satisfactorily if one will spend some time in study of those characters which are of specific importance in this group, and gain a mental concept of each specific unit. Perhaps this can only be gained by the study and comparison of a large number of specimens, but in an attempt to make these characters more readily observable to the average botanist a short key has been prepared.

One factor which contributes to the confusion surrounding this entire section is the wide range of nearly all of the forms involved. It is impossible to delimit the species geographically as the ranges of all overlap extensively.

This paper is based on the careful study of over a hundred sheets of

specimens in the Rocky Mountain Herbarium, comprising material from all the states west of the Mississippi except California and Nevada. Most emphasis has been put on the essentially Rocky Mountain species because the bulk of the material at hand represents plants of New Mexico, Colorado, and Wyoming.

- Stem excurrent, with ascending, recurved branches; heads numerous, more or less secund; rootstocks caespitose. *A. ericoides*
 Stem branched or sometimes excurrent but branches not recurved-secund, terminated by solitary, or rarely few, heads; rootstock creeping.
 Bracts well imbricated in 3-5 distinct series; pubescence hispid, spreading. *A. adsurgens*.
 Bracts nearly equal in length or the outer at least half equaling the height of the involucre.
 Bracts slightly imbricated, thick, strigose, squarrose. *A. commutatus*.
 Bracts about equal in length, thin, glabrate, not squarrose. *A. falcatus*.

ASTER ERICOIDES L. Sp. Pl. 2: 875. 1753. *A. multiflorus* Ait. Hort. Kew. 3: 203. 1789. *A. hebecladus* DC. Prodr. 5: 242. 1836. *A. scoparius* DC. l. c. not *A. scoparius* Nees. *A. multiflorus* var. *stricticaulis*, T. & G. Fl. N. A. 2: 125. 1842. *A. polycephalus* Rydb. Bull. Torr. Bot. Club 33: 153. 1906. *A. stricticaulis* (T. & G.) Rydb. Flora of the Rocky Mountains 885. 1917.

Representative Specimens. NEW MEXICO: Las Cruces, Wooton 465; Mangas Springs, Metcalfe 781; Jemez Mts., Castetter 669; Bernadillo, Castetter 900. COLORADO: Mesa Verde, Haas 80 and Bader 5; Arvada, Clokey 3908; Colorado Springs, Warren 1927; Boulder, Ramaley 2600 and 9757; New Windsor, Osterhout 3183; Fort Collins, Cowan 2697; Meeker, Robbins 7182. WYOMING: Hanna Creek, Willits 396; Lusk, A. Nelson 9604; Thermopolis, A. Nelson 9263. MONTANA: Bozeman, Blankinship Aug. 30, 1899. IDAHO: Region of the Coeur d'Alene Mountains, Leiberg 1588. WASHINGTON: Hunters, E. Nelson 1002; Yakima, E. Nelson 1168. NORTH DAKOTA: Jamestown, C. C. Schmidt, Sept. 8, 1897; Stump Lake, Tufte 286. SOUTH DAKOTA: Vicinity of Brookings, Williams Aug. 30, 1894; Custer, McIntosh 633.

The range of this species is from New England to the Pacific coast across the northern and central states and south into New Mexico, and in varying forms it has a still wider distribution.

ASTER ADSURGENS Greene, Pitt. 4: 216. 1900. *A. crassulus* Rydb. Bull. Torr. Bot. Club. 28: 504. 1901. *A. exiguus* Rydb. l. c. 505. Probably not *A. multiflorus* var. *exiguus* Fernald.

Representative Specimens. COLORADO: Piedra, Schmall 1476; Bedrock, Montrose Co., Walker 396; La Veta, Vreeland 190a¹; Pagosa

¹ The type number of *A. crassulus* Rydb. in the citation, Bull. Torr. Bot. Club 28: 505. 1901, is given as 690a with the same date which our sheet 190a carries; undoubtedly there has been an error in copying the number but we are unable to determine which is correct.

Springs, *Baker* 637; *Naturita*, *Payson* 611; near Gunnison, *Warfel* Aug. 1926; *Alathie*, *Cowan* 2698 and 2992; *Rye*, Pueblo Co., *Clokey* 4343 and 4344; near Boulder, *Ramaley* a202 and a213. WYOMING: Buffalo, *Tweedy* 3106; Sundance, *A. Nelson* 9701; Sweetwater, *A. Nelson* 2891; above Sheridan, *Sharp* 233. SOUTH DAKOTA: Harding Co., *Visher* 694; Deerfield, *McIntosh* 840. EASTERN OREGON: Grand Ronde Valley, *Cusick* 3398. EASTERN WASHINGTON: Near Spokane, *Turresson* 69. ARIZONA: Flagstaff, *Hanson* 8.

It is with reluctance that I substitute a name which has been known only in synonymy for one which has become well established, but there is no other course open to me. Dr. Rydberg reduced *A. adsurgens* Greene under *A. commutatus* but a careful comparison of his original description and that of Greene reveals the interesting fact that Greene described, not *A. commutatus*, but the same species which Rydberg a year later described as *A. crassulus*. Their only point of difference is in the amount of pubescence on the leaves, which we know is a character subject to much variation within any species of this group. Leaf-size as given by Greene is not comparable with that given by Rydberg, for the former is speaking only of leaves on sterile shoots. The involucre of *A. adsurgens* as described by Greene definitely separates this plant from *A. commutatus*, under which for years it has been reduced to synonymy.

ASTER COMMUTATUS (Torrey & Gray) Gray, Syn. Fl. 1: 185. 1884. *A. ramulosus* β . Lindl. in DC. Prodr. 5: 243. 1836. *A. multiflorus* var. *commutatus* T. & G. Fl. N. A. 2: 125. 1842. *A. incanopilosus* Sheld. Bull. Torr. Bot. Club 20: 286. 1893. *A. multiflorus* of western authors, in part.

Representative Specimens. COLORADO: Estes Park, *Ashton* 234; Piedra, *Schmoll* 1442; Norwood Hill, San Miguel Co., *Walker* 428. SOUTH DAKOTA: Perkins Co., *Visher* 645. WYOMING: Centennial, *Goodding* 2111; Laramie, *A. Nelson*, 153 & 10644; 15 miles southwest of Laramie, *Merrill & Wilcox* 1170. MINNESOTA: Battle Lake, *Sheldon*, Aug. 1892. KANSAS: Rockport, *Bartholomew* 23.

The Colorado and South Dakota specimens are typical, in my estimation. Those from Wyoming show some variation of the involucre. That of Merrill and Wilcox, and Dr. Nelson's 10644 has rather short outer bracts and the bracts of Dr. Nelson's 153 and of the Goodding specimens show very little tendency to be squarrose. The center of distribution seems to be Colorado, from which it extends eastward and northward, often in slightly varying forms.

ASTER FALCATUS Lindl. in DC. Prodr. 5: 241. 1806. *A. ramulosus* Lindl. l. c. 243. *A. Cordineri* A. Nelson Bot. Gaz. 40: 64. 1905.

Representative specimens. COLORADO: Estes Park, *Cooper* 151 (type of *A. Cordineri*), *Osterhout* 5470, *Ashton* 345; The Gunnison watershed, *Baker* 626; Trail Glen, *F. E. and E. S. Clements* 67. WYOMING: *A. Nelson*, Meyersville, 2847 (cotype of *A. Cordineri*); Centennial, 8792; Laramie, 1170; C. Y. Ranch, Big Muddy, 598; Sheridan, 8484. NORTH DAKOTA: Pingree, Stutsman Co., *Lunell*, Aug. 12, 1902.

The author has not seen true *Aster falcatus* Lindl. from Arctic America but it seems unlikely that our Rocky Mountain plant could belong to that species in spite of the extensive ranges characteristic of species in this section. There are no specimens at hand from the Northwest, which is well represented in the Rocky Mountain Herbarium by other species. Our plant does not agree entirely with Lindley's description in the *Prodromus*. The leaves of our plants are not noticeably falcate and the branches must be considered leafy rather than "paucifoliis," neither are they 3-nerved, a character given for *A. falcatus* by Macoun.¹ However, without seeing authentic *A. falcatus* Lindl. I hesitate to depose the name which Dr. Rydberg has accepted and made familiar, but if it is later shown that our plants are not the same as those from the far north the name *Aster Cordineri* A. Nelson becomes the correct name of this species. It is well represented by material from the mountainous regions of the central and northern part of Colorado and of Wyoming, and extends into North Dakota.

ROCKY MOUNTAIN HERBARIUM,
Laramie, Wyoming.

RECENT DISCOVERIES IN THE NEWFOUNDLAND FLORA

M. L. FERNALD

(Continued from page 315)

THE GENUS ANTENNARIA IN NEWFOUNDLAND.—In 1924 I published a brief synopsis of *The Dwarf Antennarias of Northeastern America*, RHODORA, xxvi. 95–102 (1924). At that time 6 species and 2 varieties of the genus were known in Newfoundland. Now, after four additional seasons in the field, we know 16 species and 2 varieties of *Antennaria* on the Island. In view of the great technical difficulty of the group, a new key to the Newfoundland representatives of the genus is offered and the new species are illustrated.

¹ Canadian Plants 1: 223. 1883.

- a. Basal leaves erect, oblanceolate to elliptic-acuminate, 2-18 cm. long, similar to the cauline ones: staminate and pistillate plants intermixed, becoming 1-2.5 dm. high; the inflorescences of the former soon shriveling: involucre deep-brown to blackish: plants sparingly or not at all stoloniferous. 1. *A. eucosma*.
- a. Basal leaves spreading, forming depressed rosettes, strongly contrasting in outline with the ascending cauline leaves: only the pistillate plants known; these humifuse or freely stoloniferous. b.
- b. Larger basal leaves 1-5 mm. wide, blunt or only obscurely or minutely mucronulate, whitened above: flowering stems only 0.5-18 cm. high: involucre deep-brown to blackish or, if pale, at most 7 mm. high. c.
- c. Cauline leaves 15-28, very crowded (except in old and "drawn" plants); the upper 7-20 with twisted scarious linear-lanceolate to linear-acicular tips 2-3 mm. long: taller flowering stems up to 4 (very rarely to 6) cm. high: involucre conspicuously imbricated, with 3-4 very unequal series of bracts. 2. *A. columnaris*.
- c. Cauline leaves 4-16; the upper 1-7 with scarious tips; taller flowering stems mostly 4-18 cm. high (only exceptionally and when very young less than 4 cm.): involucre with the bracts subequal or in 2 or 3 unequal series, with 4-6 series in no. 10, which has but 8-10 remote cauline leaves (only the upper 3-5 appendaged) d.
- d. Involucres deep-brown to blackish; the bracts subequal or in 2-3 unequal series. e.
- e. Involucres with the lower half prolonged, green and viscid, with the bracts closely and firmly appressed or agglutinated to form an ellipsoid-campanulate falsely gamophyllous cup, 7-9 mm. high: corollas 5-5.5 mm. long. 3. *A. Foggii*.
- e. Involucres with loose and distinct bracts: corollas 3-5 mm. long. f.
- f. Bracts conspicuously unequal, in 3 series; the outer about half as long as the inner: corollas 4-5 mm. long. g.
- g. Cauline leaves 6-9; the 2-3 upper with a somewhat unguiculate lance-subulate tip 0.6-1.5 mm. long: involucre 6-7 mm. high, with 20-25 bracts; the outer and median series with scarious tips 1.2-2 mm. broad: corollas 4-4.8 mm. long: style included or barely exerted, entire or subentire: achenes 1.1-1.4 mm. long, papillate. 4. *A. Bayardi*.
- g. Cauline leaves 8-14; the 4-5 upper with a narrowly oblong or lanceolate scarious tip 2-3.5 mm. long: involucre 7.5-9 mm. high, with 25-35 bracts; the outer and median with tips 2-2.5 mm. broad: corollas 4.8-5 mm. long: style exerted, bifid: achenes 1.8 mm. long, glabrous. 5. *A. brunnescens*.
- f. Bracts subequal, in 2-3 series; the outer nearly as long as the inner. h.
- h. Flowering stems at most 1.2 dm. high, with 5-8 leaves; the 3-6 upper leaves with flag-like oblong-lanceolate flat tips. i.

- i. Involucres 7–10 mm. high, with squarrose pale-brown bract-tips 1.3–2 mm. broad: the upper 3–4 cauline leaves with scarious tips: corollas 4–4.5 mm. long: achenes 1.2–1.4 mm. long.....6. *A. cana*.
- i. Involucres 6–7 mm. high, with ascending fulvous bract-tips rarely more than 1 mm. broad: the upper 4–6 cauline leaves with scarious tips: corollas 3–4 mm. long: achenes 1.6–1.8 mm. long.....7. *A. vexillifera*.
- h. Flowering stems slender, up to 18 cm. high, with the 8–15 leaves mostly subulate-tipped; only the uppermost with lance- or linear-involute scarious tips: involucres 5–6 mm. high; the outer and median bracts with oblong-linear ascending tips 1–1.7 mm. broad: corollas 3–3.8 mm. long.....8. *A. confusa*.
- d. Involucres milk-white or ochroleucous to pale-brown.....j.
- j. Cauline leaves 9–15: involucres milk-white or ochroleucous, 4.5–6 mm. high, with 2–3 series of subequal bracts: corollas 3–3.3 mm. long.....9. *A. albicans*.
- j. Cauline leaves 8–10: involucres stramineous or pale-brown, 5.5–7 mm. high, with 4–6 series of conspicuously unequal bracts: corollas 3.7–4.2 mm. long.....10. *A. straminea*.
- b. Larger basal leaves 2–17 mm. broad, distinctly mucronate or apiculate, green and glabrous to white-tomentose above: flowering stems 0.4–4 dm. high: involucres whitish, greenish or pale-brown, or rarely fulvous, (6–) 7–10 mm. high....k.
- k. The (2–) 3–6 upper cauline leaves with flat or flattish scarious tips: rosette-leaves only 2–10 mm. broad, gradually narrowed to base, scarcely petioled, with terminal mucro only 0.2–0.5 mm. long....l.
- l. Basal leaves bright-green and glabrous or promptly glabrate above, spatulate to cuneate-oblongate or narrowly cuneate-obovate, rounded at tip; cauline leaves normally 4–9: denuded old receptacles very low, much broader than high....m.
- m. Stolons and basal offshoots crowded, not elongate: basal leaves 6–15 mm. long, 2–4 mm. broad: flowering stem up to 1.5 dm. high: involucres 6–8 mm. high, brown: corollas 4.5 mm. long: achenes 1.2 mm. long, glabrous.....11. *A. Wiegandii*.
- m. Stolons elongate and slender, somewhat cord-like below the terminal rosettes: basal leaves 8–25 mm. long, 3–10 mm. broad: flowering stems up to 2.5 dm. high: involucres 7–10 mm. high; the bracts with white or whitish petaloid tips: corollas 5.5–6 mm. long: achenes 1.4–1.8 mm. long, papillate.....12. *A. spathulata*.
- l. Basal leaves white-tomentose above, 2–5 mm. broad, oblongate or narrowly obovate, acute or subacute; the cauline 8–14: denuded old receptacles elongate, as high as or higher than broad: involucres white or whitish, 7–9 mm. high: achenes papillate.....13. *A. gaspensis*.
- k. The upper cauline leaves with subulate-aristate tips (only the very uppermost, about the corymb, with tips

flattened): rosette-leaves broadly oblanceolate to broadly obovate; the larger 1-5 cm. long, 2-17 mm. broad: corolla and style together 4.8-7 mm. long*n.*

- n.* Stolons and basal offshoots rather short and assurgent (decumbent, with ascending tips): rosette-leaves oblanceolate to broadly obovate; the larger 1-5 cm. long, 2-17 mm. broad: corolla and style together 4.8-5.8 (-6.2 in *A. neodioica* var. *grandis*, unknown in Nfld.) mm. long*n.*
- o.* Rosette-leaves oblanceolate to narrowly spatulate-obovate, acute or subacute, gradually tapering to base and scarcely petioled, more or less grayish-tomentose above: flowering stems stiffly erect: cauline leaves 8-18, subapproximate or almost evenly spaced; the tips and bases of successive ones rarely becoming more than 1-4 cm. apart: corymbs compact (except in obviously aberrant individuals), 1-4 cm. broad; the heads subsessile or on rays up to 1 (very rarely to 2.5) cm. long: involucre greenish or light-brown only at base, otherwise lemon-white to milk-white or whitish-brown; its firm chartaceous blunt outer bracts mostly 1.4-2 mm. broad: denuded ripe receptacle shallowly and finely pitted; the pits narrower than the intermediate blunt ridges 14. *A. rupicola.*
- o.* Rosette-leaves narrowly to broadly obovate, mostly rounded at summit and abruptly tapering to a petiole, gray-tomentose to green and glabrous above: flowering stems slender, often becoming somewhat flexuous upon elongation: cauline leaves 6-10(-14); the upper, by prolongation of the mature flowering stem, usually becoming very remote (often 3-14 cm. apart): corymbs commonly loose, up to 3-6 cm. broad, with many elongate rays (mostly 1-3 or 4, frequently to 6-10, cm. long): involucre greenish-, purplish-, or brown-tinged, with paler bract-tips: the thin and usually scarious bracts mostly 0.7-1.4 mm. broad: denuded ripe receptacle deeply and coarsely honeycomb-pitted; the pits broader than the thin intermediate walls 15. *A. neodioica.*
- n.* Stolons procumbent or repent (lying flat) and elongated or somewhat cord-like below the leafy tips: rosette-leaves oblanceolate, acute; the principal ones 3-6.5 cm. long, 7-17 mm. broad: corolla and style together 6.3-7 mm. long. . 16. *A. petaloidea* var. *subcorymbosa.*

1. *A. EUCOSMA* Fernald & Wiegand, RHODORA, xiii. 23 (1911).—Turfy limestone barrens and slopes from Pistolet Bay westward to Four-Mile Cove, Straits of Belle Isle; region of Port au Port Bay and Bay St. George. The following specimens are at hand: Burnt Cape, Pistolet Bay, Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss, no. 29,144; Schooner (or Brandy) Island, Pistolet Bay, Pease & Long, no. 29,147; Cook Point, Pistolet Bay, Fernald & Gilbert, no. 29,145; Fernald, Gilbert & Hotchkiss, no. 29,144; Cape Norman, Wiegand, Griscom & Hotchkiss, no. 29,146, Wiegand & Long, no.

29,152; Boat Harbor, Straits of Belle Isle, *Fernald, Wiegand & Long*, no. 29,148; Big Brook, Straits of Belle Isle, *Fernald & Long*, no. 29,140, *Wiegand, Gilbert & Hotchkiss*, nos. 29,141, 29,142, *Pease & Griscom*, no. 29,143; Half-way Brooks, Straits of Belle Isle, *Pease, Griscom, Gilbert & Hotchkiss*, no. 29,149; Four-Mile Cove, Straits of Belle Isle, *Fernald, Wiegand & Long*, no. 29,150; Table Mountain, Port au Port Bay, *Fernald, Wiegand & Kittredge*, no. 4144 (TYPE), *Fernald & St. John*, no. 10,868, *Mackenzie & Griscom*, no. 10,466; Green Gardens, Cape St. George, *Mackenzie & Griscom*, no. 11,051. Species endemic in Newfoundland.

Whether the broad gap in the known range of *A. eucosma* (between the eastern Straits of Belle Isle at the northeast and Port au Port Bay at the southwest) represents the actual absence of the species from that extensive area seems highly improbable. Many species, originally described from Table Mountain, Port au Port, or from Cape St. George, and subsequently seen on the Straits of Belle Isle, were found by us on the intermediate limestones centering on Pointe Riche (such plants as *Erigeron hyssopifolius* var. *villicaulis* Fernald, *Antennaria albicans* Fernald and *Arnica terrae-novae* Fern.).

The plant of Anticosti, mentioned at the time *A. eucosma* was published as "apparently referable to this species, but the material . . . inadequate for final determination," has been subsequently collected at numerous stations by Bro. Victorin and his associates. It proves to be *A. pulcherrima* (Hook.) Greene.

2. **ANTENNARIA columnaris**, sp. nov. (TAB. 263), humifusa, caulibus repentibus stragula densa 2–10 cm. diametro formantibus; stolonibus foliosis confertis ad 2 cm. longis; foliis basilaribus oblanceolatis vel anguste obovatis vix petiolatis 5–9 mm. longis 1.5–4 mm. latis vix vel brevissime mucronulatis albido-tomentosis, tomento coactili; caule florifero 0.5–4 (deinde rarissime –6) cm. alto; foliis caulinis 15–28 confertis vel superioribus deinde subdistantibus linearibus erectis, imis obtusis, mediis attenuatis mucronatis 0.7–2 cm. longis 1–2 mm. latis dorso strigosis, superioribus 7–20 apice scarioso lineari-lanceolato vel lineari-aciculari torto 2–3 mm. longo munitis; capitulis femineis 1–6 corymbosis subcylindricis (in statu exsiccato turbinato-campanulato); involucre 5.5–8.5 mm. alto basi lanato; bracteis 30–50 3–4-seriatis valde imbricatis, exterioribus lineari-oblongis obtusis vel subacutis fulvescentibus, interioribus angustioribus acuminatis plerumque fuscis erosis; corolla 4 mm. longo apice purpurascente; stylo purpurascente exserto bifido; achaeniis laevibus 1.2 mm. longis.—NEWFOUNDLAND: dry peaty and turfy limestone barrens, Gargamelle Cove, July 20, 1929, *Fernald, Long & Fogg*, no. 2076 (TYPE in Gray Herb.); peaty and turfy limestone barrens, Pointe Riche, July 24, 1929, *Fernald, Long & Fogg*, no. 2077. See p. 54.

A. columnaris, in the great abundance of cauline leaves, which during anthesis give the flowering stems the appearance of broad columns or (in the lower stems) small barrels, is unique. In many characters it suggests dwarfed *A. confusa* (described below; see PLATE 268) but it has usually many more leaves and very many more of the upper leaves with scarious appendages, and, when well developed, its heads are decidedly larger and with more imbricated bracts. *A. columnaris* also strongly resembles *A. angustata* Greene of Baffin Island and northern Labrador, but that species has the narrower basal leaves prominently mucronate, the cauline leaves few and the upper ones with broad and flat appendages.

3. ANTENNARIA **Foggii**, sp. nov. (TAB. 264), humifusa, caulibus ramosissimis repentibus stragula 0.3–1.8 dm. diametro formantibus; stolonibus foliosis plus minusve confertis 1–3 cm. longis; foliis basilariibus cuneato-oblongatis vel anguste obovatis vix petiolatis 4–16 mm. longis 2–4 (–5) mm. latis apice rotundatis vel subacutis obsolete vel brevissime mucronulatis utrinque albido-tomentosis tomento coactili; caule florifero 4–13 cm. alto floccoso-tomentoso; foliis caulinis 8–16 subdistantibus floccoso-tomentosis, imis linearibus obtusis, mediis linearibus acutis 8–16 mm. longis 1–2.5 mm. latis apice subulatis, superioribus 4–7 (2–3 involucriforibus inclusis) apice scarioso lanceolato 1.5–4 mm. longo munitis; capitulis femineis 1–3 (–5) corymbosis ellipsoideo-campanulatis (in statu exsiccato late campanulatis); involucrio 7–9 mm. alto basi viscido-lanato sub medio prolongato viridescens bracteis 30–40 viscidis obscuris valde adpressis vel agglutinatis involucri apice coroniformibus, bractiarum superiorum apicibus 3-seriatis rosulatis oblongis brunnescentibus vel fuscescentibus 1.5–2 mm. latis, interioribus erosis vel eroso-fimbriatis; corolla 5–5.5 mm. longa apice purpurascens; stylo purpurascens exserto bifido; acheniis laevibus 1.7 mm. longis; planta mascula ignota.—NEW-FOUNDLAND, limestone barrens bordering St. John Bay and Ingornachioix Bay: peaty turf on limestone barrens northeast of Old Port au Choix, St. John Bay, July 21, 1929, *Fernald, Long & Fogg*, no. 2100 (TYPE in Gray Herb.); dry gravelly limestone barrens back of Crow's Head, St. John Bay, July 23, 1929, *Fernald, Long & Fogg*, no. 2101; dry gravelly limestone barrens, Pointe Riche, between St. John Bay and Ingornachioix Bay, July 24, 1929, *Fernald, Long & Fogg*, no. 2102; dry gravelly limestone barrens, Eastern Point, St. John Bay, July 26, 1929, *Fernald, Long & Fogg*, no. 2103; dry peaty and turfy limestone barrens, Gargamelle Cove, Ingornachioix Bay, July 20, 1929, *Fernald, Long & Fogg*, no. 2099 (less characteristic, with larger leaves and usually more heads with slightly looser outer bracts than the other nos.). See p. 54.

Antennaria Foggii, with which it is a great pleasure to associate the

name of one of my former students and Mr. Long's and my stimulating, untiring and always companionable associate on two Newfoundland trips, John Milton Fogg, Jr., is unique among the species of eastern America in having the bracts of the viscid or glutinous green lower half of the involucre so closely coherent as to give the involucre (at least when fresh) an almost gamophyllous aspect. In its very large involucre, with broad, oblong bract-tips, *A. Foggii* is suggestive of *A. cana* Fernald, another Newfoundland endemic, and *A. pygmaea* Fernald, of northern Labrador and Baffin Island. In both those species, however, the outer bracts are looser. In *A. cana* the flowering stems are lower, with fewer leaves, the involucral bracts narrower and the corolla shorter; in *A. pygmaea* the bracts are at most 5 cm. broad, the basal leaves narrowly oblanceolate, glabrous and mucronate; the upper cauline with a broad-lanceolate to deltoid tip, the 1 or 2 heads with regularly imbricated involucre and corollas only 4 mm. long.

4. **ANTENNARIA Bayardi** sp. nov. (TAB. 265), humifusa, caulibus repentibus stragula 0.3–1.3 dm. diametro formantibus; stolonibus foliosis ad 3.5 cm. longis; foliis basilaribus cuneato-obovatis subrhomboideis apice subacutis vix mucronatis 5–10 mm. longis 2–5 mm. latis albido-tomentosis, tomento minuto pannoso deinde sublucido; caule florifero gracile 0.3–1.5 dm. alto floccoso-tomentoso; foliis caulinis 6–9 remotis lineari-oblongis laxe tomentosis, imis obtusis, mediis 0.9–1.4 cm. longis 1.5–3 mm. latis subacutis breviter mucronatis, superioribus 2–3 apice lanceolato-subulato scarioso plus minusve unguiculato 0.6–1.5 mm. longo munitis; capitulis femineis (1–) 3–6 corymbosis subcylindrico-urceolatis (in statu exsiccato subturbinatis), pedunculis plus minusve inaequalibus; involucre 6–7 mm. alto basi lanato; bracteis 20–25 3-seriatis valde inaequalibus, anguste oblongis, exteriorum basi viridiscensibus vel obscure brunneis apicibus sordidis vel fulvis vel pallide fuscis 1.2–2 mm. latis, interioribus angustioribus acuminatis; corolla 4–4.8 mm. longa apice purpurascens vel pallida; stylo incluso vel vix exserto integro vel subintegro; achaeniis 1.1–1.4 mm. longis hirtellis; planta mascula ignota.—NEWFOUNDLAND: dry humus over limestone ledges and shingle, Hannah's Head, Lower Humber Valley, July 12, 1929, *Fernald, Long & Fogg*, no. 2095; shelves of limestone cliff, Druid's (or Raglan) Head, Middle Arm, Bay of Islands, July 16, 1929, *Fernald, Long & Fogg*, no. 2096; limestone cliffs and talus, Tucker's Head, Main Arm, Bonne Bay, August 12, 1929, *Fernald, Long & Fogg*, no. 2097 (TYPE in Gray Herb.). See pp. 48, 83.

A. Bayardi, one of the most distinctive species of eastern North America, is named in appreciation of the loyal companionship and

keen instinct for the finer details of accurate botanical exploration of my companion on many Newfoundland cliffs and barrens, Bayard Long.

A. Bayardi is not closely related to any other small-leaved species of Newfoundland. In its hirtellous achenes it is almost unique, in this character agreeing with *A. isolepis* Greene of the northern half of the Labrador Peninsula and *A. subviscosa* Fernald of Rimouski and Gaspé Counties, Quebec. From both these it is quickly distinguished by its short and broad rosette-leaves; from *A. isolepis* by the blunt tips of the rosette-leaves, the short-mucronate tips of the median cauline and the delicate subulus of the upper cauline leaves (the rosette-leaves of *A. isolepis* being distinctly mucronate, and all but the lowermost cauline bearing broad flat appendages); from *A. subviscosa* by the closer tomentum of the rosette-leaves, shorter, broader and blunter cauline leaves, essential lack of glandularity and dark involucre (*A. subviscosa* having the basal leaves loosely tomentose, the median and upper cauline linear-attenuate and glandular-hirsute, and the glandular-viscid involucre cream-colored or buff to rose-tinted). *A. Bayardi* is also closely related to *A. intermedia* (Rosenv.) Porsild, of western Greenland, and *A. umbrinella* Rydb., of the Rocky Mountains. Both these species, however, have the pubescence of the basal leaves looser, the corymbs more symmetrical, the scarious tips of the involucre bracts broader and more rounded, and the achenes quite glabrous; furthermore the basal leaves of *A. intermedia* are much narrower and sharper-pointed.

All of these localized endemics (*A. intermedia* of nunataks of western Greenland, *A. isolepis* of the unglaciated area of northern Labrador, *A. Bayardi* of the unglaciated mountains of western Newfoundland, *A. subviscosa* of vertical nunatak-cliffs of Rimouski and Gaspé Counties, Quebec, and *A. umbrinella* of the Rocky Mts.) are obviously closely related; and they all have the simple to but slightly cleft style included or barely exerted, the other dwarf species of Newfoundland having the style definitely exerted and finally deeply cleft.

In publishing *A. umbrinella*, Rydberg said: "I describe this species as new, with some hesitation, not that I have any doubt concerning its distinctness from *A. alpina* and our North American species, but it is so closely similar to *A. Magellanica* Sch. Bip. that if it were not for the great distance between their ranges and for the slightly longer leaves and more slender caudex of the latter, I would regard the two

as one species,"¹ *A. magellanica* Sch. Bip. Flora, xxxviii. 117 (1855), with "achaeeniis . . . sparse hirtis," was based upon Lechler's no. 1049a from "Sandy Point" (Punta Arenas) on the Straits of Magellan and an excellent sheet in the Gray Herbarium of this type-collection is well matched by a later collection from the Straits of Magellan by Cunningham. In publishing *A. magellanica*, Schultz Bipontinus suggested that it was very close to *A. chilensis* Remy. *A. chilensis* Remy in C. Gay, Fl. Chil. iv. 235 (1849) was from an undesignated province, presumably from the Straits. A beautiful sheet in the Gray Herbarium of this original collection of *A. chilensis*, showing 4 plants with 6 flowering stems in full anthesis, indicates that *A. magellanica* (1855) should be united with *A. chilensis* (1849). Although very similar to several North American plants, *A. chilensis* is not well matched by any of them. It has narrowly spatulate basal leaves 1-2 cm. long, 2.5-4 mm. wide, rounded at apex or obtuse and densely lanate above; the 7-9 linear or linear-oblong cauline leaves 1.5-2 mm. broad, quite lanate and mucronate; the corymbs glomeruliform; the involucre only 5 mm. high, with very unequal creamy to slightly brownish, obtuse, oblong bracts in 3 series. *A. chilensis* is perhaps more nearly simulated by *A. straminea* Fernald, of Newfoundland, than by any other North American species. *A. straminea*, however, has shorter and broader basal leaves, with more pannose tomentum; narrower cauline leaves, the upper with dilated appendages; and even more imbricated involucre (of about 5 series).

The close relationship of the single endemic Patagonian species, *A. chilensis*, with the very extensive series of localized species of cordilleran North America, Greenland, northern Labrador, western Newfoundland and the Gaspé region is of peculiar significance in view of the relationships between these (or some of these) areas repeatedly pointed out in other groups: *Carex macloviana* D'Urv. of Chile, northwestern North America, Gaspé, Labrador, Greenland and arctic Europe, with very numerous endemic allies in cordilleran North America; *Empetrum rubrum* Vahl of subantarctic islands and the Andes of Chile, with its nearest allies two species centering on the Gulf of St. Lawrence;² *Primula decipiens* Duby (*P. "magellanica"*) of the Falkland Islands and Patagonia, the only representative in the southern hemisphere of the complex boreal *Primula* § *Farinosae*;³

¹ Rydberg, Bull. Torr. Bot. Cl. xxiv. 302 (1897).

² See Fernald & Wiegand, RHODORA, xv. 213-217 (1913); Fernald, *ibid.*, xxvi. 93 (1924); Fernald, Mem. Am. Acad. xv. 261, 262 (1925).

³ See Fernald, RHODORA, xxx. 74-77 (1928).

Polystichum mohrioides (Bory) Presl of the subantarctic islands and Fuegia, with more or less separable geographic varieties in the Andes, in the cordilleran region of North America and on the Gaspé Peninsula;¹ and many other species, some with numerous localized boreal endemic allies, others, like *Carex capitata* L., *C. incurva* Lightf., *C. microglochin* Wahlenb., *Draba magellanica* Lam., *Plantago juncooides* Lam., etc., etc., with little if any recognized differentiation in the remote areas.

5. **ANTENNARIA brunnescens**, sp. nov. (TAB. 266), humifusa, caulibus ramosissimis repentibus stragula 0.3–1.8 dm. diametro formantibus; stolonibus foliosis ad 2 cm. longis; foliis basilaribus spathulatis vel anguste cuneato-obovatis apice brevissime mucronatis 5–14 mm. longis 2–4 mm. latis supra albidis, tomento denso minuto; caule florifero 5–14 cm. alto floccoso-tomentoso; foliis caulinis 8–14, subdistantibus linearibus strictis glabratis, imis obtusis, mediis 1–1.5 cm. longis 1–1.7 mm. latis acutis apice subulatis, superioribus 4–5 apice scarioso lanceolato vel anguste oblongo plano 2–3.5 mm. longo munitis; capitulis femineis 1–4 cylindrico-campanulatis (in statu exsiccato turbinatis) corymbosis; involucre 7.5–9 mm. alto basi lanato; bracteis 25–35 3-seriatis valde inaequalibus tenuibus oblongo-lanceolatis subacutis, exterioribus badiis 2–2.5 mm. latis interioribus brunnescentibus lacerato-erosis; corolla 4.8–5 mm. longa apice purpurascente; stylo exserto bifido purpurascente; achaeniis 1.8 mm. longis glabris; planta mascula ignota.—NEWFOUNDLAND: turfey limestone crest (alt. 650 m.) Killdevil, Main Arm of Bonne Bay, August 23, 1929, Fernald, Long & Fogg, no. 2105. See p. 89.

In its very large heads with strongly unequal series of bracts *A. brunnescens* resembles *A. borealis* Greene of Alaska and *A. fusca* Elias Nelson of the mountains of Wyoming. From them both it is at once distinguished by its acutish and brown rather than obtuse and lead-colored bracts and by its narrower cauline leaves with more slender appendages. In *A. fusca*, furthermore, the rosette-leaves are much broader, the cauline leaves much longer, and the corollas pale instead of purple-tipped. In eastern North America the only small-leaved and dark-headed species which approaches *A. brunnescens* in size of involucre (7.5–9 mm. high), length of corolla (4.8–5 mm.) and length of achene (1.8 mm.) is *A. Foggii* described above; but the involucre of that species, with the bases of the subequal bracts green and agglutinated to simulate a gamophyllous cup, is wholly different from that of *A. brunnescens*, in which the short outer series is castaneous at base and quite free.

¹ See Fernald, RHODORA, xxvi. 89–93 (1924).



ANTENNARIA FOGGII, $\times 1$; insert $\times 2$.



ANTENNARIA BAYARDI, $\times 1$; insert $\times 2$.



ANTENNARIA BRUNNESCENS, $\times 1$; insert $\times 2$.



ANTENNARIA CANA, $\times 1$; inserts $\times 2$.

6. *A. CANA* (Fernald & Wieg.) Fernald, *RHODORA*, xviii. 236 (1916), as to type-specimen (Pointe Riche, Newfoundland, *Fernald & Wiegand* no. 4139), not as to other specimens cited, and as to description only in part; Fernald, *RHODORA*, xxvi. 98, only in part and not including t. 142, fig. 3 (1924). *A. alpina*, var. *cana* Fernald & Wiegand, *RHODORA*, xiii. 24 (1911) as to type-specimen cited. PLATE 267.

Antennaria alpina, var. *cana* Fernald & Wiegand (1911) was a hopeless medley, published before the northern *Antennarias* of eastern America had begun to be properly studied. Its cited specimens belong to several species now clearly differentiated; but the TYPE from Pointe Riche (*Fernald & Wiegand*, no. 4139), having been definitely designated, must settle the final application of the name. When I elevated the variety to specific rank, restricting it to plants of western Newfoundland, I retained in it the two original Newfoundland elements: the TYPE, from Pointe Riche and the plant of Table Mountain, Port au Port Bay (*Fernald & Wiegand*, no. 4141), supplemented by later collections from the latter locality. Subsequent collections brought in much material like that from Table Mountain and gradually I came to think of and to recognize this plant as *A. cana* and under this name I have distributed much material. A much more local plant than the one I have generally been calling *A. cana* was collected along the Straits of Belle Isle in 1925 and, since it was so wholly distinct from that and all other recognized species of the genus, it was published as *A. Longii* Fernald, *RHODORA*, xxviii. 237 (1926). During the past summer both these plants were found in abundance on Pointe Riche and in its vicinity and I am chagrined to find that the Pointe Riche TYPE of *A. cana* is exactly *A. Longii* and not the much commoner plant (originally cited only from Table Mountain) which has been passing as *A. cana*.¹ *A. cana*, as now restricted, was accurately described as *A. Longii* Fernald, l. c. (1926). It is much more localized than the plant which has been confused with it. PLATE 267 shows characteristic material from the type locality of *A. cana* (at left) and also some of the type material of *A. Longii* (at right).

The material now at hand shows true *A. CANA* (*A. Longii*) from the following stations, all in northwestern Newfoundland: dry limestone gravel on barrens, Schooner (or Brandy) Island, Pistolet Bay, *Pease*

¹ This lamentable psychological error arose through the shortsighted practise followed in our first two seasons' work in Newfoundland, of labeling all material as collected by *Fernald & Wiegand*, regardless of whether both of us had been the actual collectors. I was at Blanc Sablon while Wiegand was at Pointe Riche, but we collected together on Table Mountain. Thus the Table Mountain plant long stood in my mind as *A. cana*, although the Pointe Riche plant had been designated as the type.

& Long, no. 29,177 (TYPE of *A. Longii*); Cape Norman, *Wiegand & Long*, nos. 29,180, 29,181; Boat Harbor, Straits of Belle Isle, *Fernald, Wiegand & Long*, no. 29,178; Four-Mile Cove, Straits of Belle Isle, *Fernald, Wiegand & Long*, no. 29,179; back of Crow's Head, St. John Bay, *Fernald, Long & Fogg*, no. 2086; Eastern Point, St. John Bay, *Fernald, Long & Fogg*, no. 2089; Pointe Riche, *Fernald & Wiegand*, no. 4139 (TYPE), *Fernald, Long & Fogg*, no. 2087; dry upper diorite rock-crests at about 750 m. alt., Lookout Mountain, Bonne Bay, *Fernald, Long & Fogg*, no. 2104 (material over-ripe, only doubtfully referred here). Species endemic in Newfoundland.¹

The commoner plant which has erroneously passed as *A. cana* and which was illustrated as that species in *Fernald, RHODORA*, xxvi. t. 142, fig. 3, is described below as no. 8.

7. *A. VEXILLIFERA* Fernald, *RHODORA*, xxvi. 99, t. 142, fig. 4 (1924).—Local on dry gravelly limestone barrens, Pistolet Bay to St. John Bay; Cook Point, Pistolet Bay, *Fernald & Gilbert*, no. 29,171; Boat Harbor, Straits of Belle Isle, *Fernald, Wiegand & Long*, no. 29,172; Eastern Point, St. John Bay, *Fernald, Long & Fogg*, no. 2085. Otherwise known only from the Shickshock Mts. of the Gaspé Peninsula.

8. *ANTENNARIA confusa*, sp. nov. (TAB. 268, plant at left), humifusa, caulibus ramosissimis repentibus stragula 0.2–10 cm. diametro formantibus; stolonibus foliosis confertis perbrevis (ad 2 cm. longis); foliis basilaribus oblanceolatis vel anguste cuneato-obovatis apice obtusis vel subacutis vix mucronatis 3–11 mm. longis 1–5 mm. latis supra albidis, tomento denso minuto; caule florifero 0.3–1.8 dm. alto floccoso-tomentoso; foliis caulinis 8–15 subapproximatis deinde subdistantibus linearibus, imis obtusis, mediis 8–15 mm. longis 1–2 mm. latis strictis acutis apice subulatis, superioribus 3–4 apice scarioso lanceolato- vel lineari-involuto 2–3 mm. longo munitis; capitulis femineis (1–)2–6 campanulatis corymbosis; involucrio 5–6 mm. alto basi subviscido-lanato; bracteis 20–30, 2–3-seriatis subaequalibus tenuissimis, exterioribus anguste oblongis vel oblongo-linearibus obtusis 1–1.7 mm. latis fulvescentibus vel fusciscentibus, interioribus angustioribus acuminatis vel apiculatis erosis; corolla 3–3.8 mm. longa apice purpurascens; stylo purpurascens exserto bifido; achaeniis laevibus 1.5 mm. longis; planta mascula ignota.—NEWFOUNDLAND,

¹ Since the above went into type I have examined a specimen of *Antennaria cana*, collected at 5500 feet alt., Mt. Redfern Valley, northern British Columbia, August 2, 1932, by Mrs. J. Norman Henry (no. 309, Herb. Phil. Acad.). Mrs. Henry's material can be separated on no character evident in the single specimen from the smaller-headed individuals of *A. cana* of northwestern Newfoundland. This abundantly demonstrated relationship of the floras of western Newfoundland, the Mingan Islands, Anticosti and Gaspé and of the northern Rocky Mts. is further displayed by Mrs. Henry's discovery in northern British Columbia of *Lesquerella Purshii* (Wats.) Fern., a species heretofore known only from western Newfoundland and Anticosti (see p. 267 and t. 258); and by the finding by Dr. H. M. Raup on an adjacent mountain of northern British Columbia of *Agoseris gaspensis* Fern., previously known only from the Shickshock Mts.

in dry gravel or dry humus on limestone ledges and barrens, from Pistolet Bay to Port au Port Bay: Burnt Cape, Pistolet Bay, *Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss*, no. 29,157; Schooner (or Brandy) Island, Pistolet Bay, *Pease & Long*, no. 29,159; Cook Point, Pistolet Bay, *Fernald & Gilbert*, no. 29,160; Cape Norman, *Wiegand, Griscom & Hotchkiss*, no. 29,158; Boat Harbor, Straits of Belle, *Fernald, Wiegand & Long*, no. 29,162, Big Brook, Straits of Belle Isle, *Pease & Griscom*, no. 29,156; one mile back of Savage Cove, *Fernald & Long*, no. 29,155; Savage Point, Straits of Belle Isle, *Fernald, Wiegand, Pease, Long, Gilbert & Hotchkiss*, no. 29,154 (young, involucre blackish); Sandy (or Poverty) Cove, Straits of Belle Isle, *Fernald, Long & Gilbert*, no. 29,173; Rock Marsh, Flower Cove, *Fernald, Long & Dunbar*, no. 27,144; Brig Bay, *Fernald, Long & Dunbar* no. 27,145; limestone bluff opposite western escarpment of Bard Harbor Hill, *Fernald & Long*, no. 29,163; St. John Island, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 29,169; back of Crow's Head, St. John Bay, *Fernald, Long & Fogg*, no. 2079; Old Port au Choix, *Fernald, Long & Fogg*, nos. 2078 (TYPE in Gray Herb.), 2082; Eastern Point, St. John Bay, *Fernald, Long & Fogg*, no. 2081; Pointe Riche, *Fernald, Long & Fogg*, no. 2080; Hannah's Head, lower Humber Valley, July 12, 1929, *Fernald, Long & Fogg*, no. 2090; tableland, alt. 200–300 m., Table Mountain, Port au Port Bay, *Fernald & Wiegand*, no. 4141 (included in original publication of *A. alpina*, var. *cana*), *Fernald & St. John* in Pl. Exsicc. Gray. no. 290, *Mackenzie & Griscom*, no. 10,467; all but the latest collections erroneously labeled *A. cana* (Fernald & Wiegand) Fernald.

As already pointed out, *A. confusa* is the comparatively common dark-headed dwarf *Antennaria* of the limestone barrens of western Newfoundland, until now passing erroneously as *A. cana*. This confusion arose through the fact that, before it was realized that there are many species of the group in western Newfoundland, the two were united; but since the TYPE of *A. cana* is, unfortunately, inseparable from the plant later called *A. Longii*, the name *A. cana* must be restricted to the latter species (t. 267). A somewhat diagrammatic drawing of a small specimen of *A. confusa* was shown in Fernald, RHODORA, xxvi. t. 142, fig. 3, as *A. cana*. *A. confusa* is very quickly distinguished from true *A. cana* (*A. Longii*) by having the basal leaves mostly narrower and not rounded at summit; the flowering stems more slender, taller and more leafy (the stoutish stems of *A. cana* usually 2–5, rarely –9, cm. high and with only 4–8 leaves); the appendages of the upper leaves very slender-tipped (those of *A. cana* broader and blunt); the involucre only 5–6 mm. high (in *A. cana* 7–10 mm. high); and the corollas less than 4 mm. long (in *A. cana* 4–5 mm.).

In its slender habit, small heads and short corolla *A. confusa* is nearest *A. vexillifera* Fernald, RHODORA, xxvi. 99, t. 142, fig. 2 (1924), but that species has only 5–8 cauline leaves, nearly all of them with broad and flat oblong-lanceolate appendages, and larger heads with narrower bracts.

9. *A. ALBICANS* Fernald, RHODORA, xvi. 197 (1914) and xxvi. 100, t. 145, fig. 6 (1924).—Dry shingly, gravelly or turfy limestone barrens from Pistolet Bay to Port au Port Bay: Burnt Cape, Pistolet Bay, Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss, no. 29,164; Schooner (or Brandy) Island, Pistolet Bay, Pease & Long, no. 29,166; Cook Point, Pistolet Bay, Fernald & Gilbert, no. 29,165; Ice Point, St. Barbe Bay, Wiegand, Gilbert & Hotchkiss, no. 29,161; Eastern Point, St. John Bay, Fernald, Long & Fogg, no. 2083; Gargamelle Cove, Ingornachioix Bay, Fernald, Long & Fogg, no. 2084; Table Mountain, Port au Port Bay, Fernald, & St. John, no. 10,869 (TYPE). Endemic in Newfoundland.

10. *A. STRAMINEA* Fernald, RHODORA, xvi. 130 (1914) and xxvi. 100, t. 145, fig. 8 (1924).—Dry shingly, gravelly or peaty limestone barrens, Pistolet Bay to Bay St. George; turfy and rocky crests, Notre Dame Bay: Burnt Cape, Pistolet Bay, Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss, no. 29,168; Shoal Cove, Straits of Belle Isle, Pease & Griscom, no. 29,176; Savage Point, Straits of Belle Isle, Fernald, Wiegand, Pease, Long, Gilbert & Hotchkiss, no. 29,175; Ice Point, St. Barbe Bay, Wiegand, Gilbert & Hotchkiss, no. 29,167; Brig Bay, Fernald, Long & Dunbar, no. 27,187; St. John Island, Fernald, Wiegand, Long, Gilbert & Hotchkiss, no. 29,170; Old Port au Choix, Fernald, Long & Fogg, no. 2091; Pointe Riche, Fernald & Wiegand, no. 4140, Fernald, Long & Fogg, nos. 2092, 2093; limestone crest (alt. 650 m.), Killdevil, Main Arm, Bonne Bay, Fernald, Long & Fogg, no. 2094; Green Gardens, Cape St. George, Mackenzie & Griscom, no. 11,098; Twillingate, Fernald, Wiegand & Bartram, no. 6340 (TYPE); without definite locality, "Terre-neuve," 1828 (herb. Shuttleworth, Brit. Mus.). Endemic in Newfoundland.

11. *A. WIEGANDII* Fernald, RHODORA, xxviii. 238 (1926).—Very local, St. John Bay and Bay of Islands: turfy limestone barrens, St. John Island, Fernald, Wiegand, Long, Gilbert & Hotchkiss, no. 29,153 (TYPE); turfy and peaty knolls bordering limestone barrens, Eastern Point, St. John Bay, Fernald, Long & Fogg, no. 2098; trap ledges and gravel, subalpine southern slope of Lark Mountain, Bay of Islands, Fernald, Long & Fogg, no. 463 (distributed as *A. spathulata* "dwarfed subalpine form"). Endemic in Newfoundland. See p. 54.

12. *A. SPATHULATA* Fernald, RHODORA, xvi. 196 (1914) including var. *continentis* Fernald & St. John in St. John, Bot. Expl. No. Shore Gulf St. Lawr. 55 (1922). *A. canadensis*, var. *spathulata* Fernald, RHODORA, xvi. 132 (1914).—The most widely dispersed species of Newfoundland, occurring chiefly in turf or humus over calcareous or

noncalcareous ledges, shingle or gravel from Pistolet Bay to the Avalon Peninsula and to Bay St. George. The following specimens are before me: South Arm River, Holyrood, August 23, 1894, *Robinson & Schrenk*; Rushy Pond, Exploits Valley, *Fernald, Wiegand & Darlington*, no. 6362 (type); Burnt Cape, Pistolet Bay, *Fernald, Wiegand, Pease, Long, Griscom, Gilbert & Hotchkiss*, nos. 29,182, 29,184; St. John Island, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 29,183; Pointe Riche, *Fernald & Wiegand*, no. 4143, *Fernald, Long & Fogg*, nos. 2109, 2110; Table Mountain, Port au Port Bay, *Fernald & St. John*, no. 10,870, *Mackenzie & Griscom*, no. 10,468; Cape St. George, *Mackenzie & Griscom*, no. 11,119. Known also from the mouth of the Natashquan, Saguenay Co., Quebec, and from Anticosti Island. See p. 54.

13. *ANTENNARIA gaspensis* (Fernald), comb. nov. TAB. 268, plant at right. *A. neodioica*, var. *gaspensis* Fernald, Ottawa Nat. xix. 156 (1905).

When I published *A. neodioica*, var. *gaspensis* our understanding of the genus in eastern America was still very rudimentary, and certain characters now found to be very constant and of diagnostic value had not then been noted. My own field-experience with the plant was on the limestones of Percé in 1904 and 1905 and, although Victorin, Rolland, Brunel, Rousseau and others had repeatedly been collecting it at the tip of the Gaspé Peninsula and on Anticosti Island, I had not seen the plant growing since 1905 until 1929, when Messrs. Long, Fogg and I found it on the limestone headlands near the "bottom" (or head, as we should say) of the Middle Arm of Bay of Islands and on similar headlands on Bonne Bay. So very characteristic was the plant with its slenderly subcylindric whitish heads (in the dried condition turbinate) that it did not occur to any of us to associate it with *A. neodioica* Greene, in which the more or less green- or purple-tinged heads are more campanulate or subhemispherical (in the dried condition broadly rounded at base). The Newfoundland material proves to be quite like the type-collection of *A. neodioica*, var. *gaspensis*, and study in the herbarium reinforces our field-impression in Newfoundland that the plant is quite distinct from *A. neodioica*. Briefly the diagnostic characters are as follows:

A. GASPENSIS. Rosette-leaves oblanceolate or narrowly obovate, 2-5 mm. broad, strongly whitened above: the terminal mucro or subulus only 0.2-0.5 mm. long: subulus of the median cauline leaves prolonged and commonly unguiculate; tips of the 3-5 upper leaves with pale scarious linear-oblong appendages: fresh involucre slenderly cylindric, becoming turbinate in drying, of 25-35 linear-oblong whitish or light-brown bracts: denuded receptacle ovoid, as high as or higher than broad.

A. NEODIOICA. Rosette-leaves broadly oblanceolate to broadly obovate, 2–17 mm. broad, with the green surface obvious through the grayish tomentum (or rarely glabrous); the terminal mucro or subulus 0.5–1 mm. long; subulus of the median cauline leaves usually straight; the upper leaves (except rarely at base of corymb) with slender and prolonged, often curved, subulate tips: fresh involucre campanulate to hemispherical, the dried broadly rounded at base, of 35–50 or more greenish- or purplish-tinged bracts: denuded receptacle a low rounded dome, distinctly broader than high.

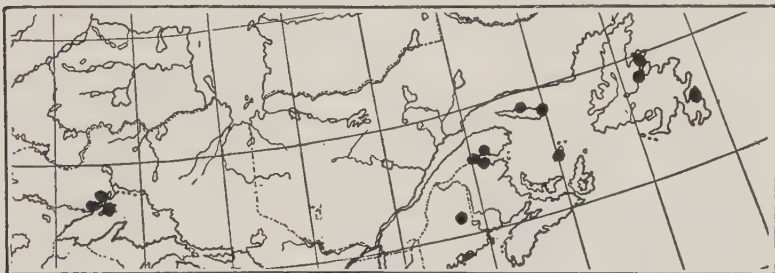
On account of its very narrow leaves much material of the narrowest-leaved extreme of *A. neodioica*, var. *attenuata* has been identified and often reported as *A. neodioica*, var. *gaspensis*. True *A. gaspensis*, as shown by the large series now collected, is confined to the limestones at the eastern end of the Gaspé Peninsula and to Anticosti Island and the limestone mountains of western Newfoundland.

The following collections are referred to *A. GASPENSIS*. NEWFOUNDLAND: turf over limestone talus, Druid's (or Raglan) Head, Middle Arm, Bay of Islands, *Fernald, Long & Fogg*, no. 2106; turf limestone ledges and talus, eastern dome of Penguin Head, Middle Arm, Bay of Islands, *Fernald, Long & Fogg*, no. 2107; limestone cliffs and talus, Tucker's Head, Main Arm, Bonne Bay, *Fernald, Long, & Fogg*, no. 2108. QUEBEC: talus calcaires, Rivière Vaureal, Anticosti, *Victorin, Rolland & Louis*, no. 21,327; sur les talus calcaires, Riv. à la Patate, Anticosti, *Victorin, Rolland & Louis*, no. 21,332; sur les talus secs aux bords de l'entrée, Riv. des Caps, Anticosti, *Victorin & Rolland*, no. 27,615; Jupiter River, Anticosti, *J. Macoun*, no. 70,448; platnières de l'embouchure, Riv. Jupiter, Anticosti, *Victorin & Rolland*, nos. 25,377, 25,383; calcareous cliffs near Cape Rosier, *A. S. Pease*, no. 20,202; sur le rebord de la falaise, "La Vieille," Cap Gaspé, *Victorin, Germain, Brunel & Rousseau*, no. 17,548; turf crest of sea cliffs, Cape Gaspé, *Pease*, no. 20,204; alluvions caillouteux côté sud du Forillon, au-delà de Grande-Grève, près de l'Anse-à-l'Andien, *Victorin, Rolland, Brunel & Rousseau*, no. 17,549; limestone shingle, Le Coulé, Percé, August 17, 1904, *Collins, Fernald & Pease*; gravelly slopes, Les Murailles, Percé, August 17, 1904, *Collins, Fernald & Pease*; dry calcareous gravel, Mt. Ste. Anne, Percé, August 18, 1904, *Collins, Fernald & Pease*, also *Collins, Fernald & Pease*, no. 142 (TYPE in Gray Herb.), *Fernald* in Pl. Exsicc. Gray. no. 291, *Victorin, Rolland, Brunel & Rousseau*, no. 17,550. See pp. 51, 83.

14. *A. RUPICOLA* Fernald, RHODORA, i. 74 (1899). *A. neodioica*, var. *rupicola* Fernald, RHODORA, xvi. 132 (1914).—In Newfoundland known only in the southeastern half of the island, from the Avalon Peninsula to Notre Dame Bay and the Exploits Valley: dry crests and rocky slopes of sandstone and arenaceous slate hills back of Carbonear, *Fernald & Wiegand*, no. 6349; dry cliffs and talus, Tilt Cove, *Fernald, Wiegand & Darlington*, no. 6347; sandstone ledges and talus, Grand

Falls, *Fernald, Wiegand, Bartram & Darlington*, nos. 6341–6348; no. 6345 aberrant in having stolons and supernumerary branches developed from the upper axils.

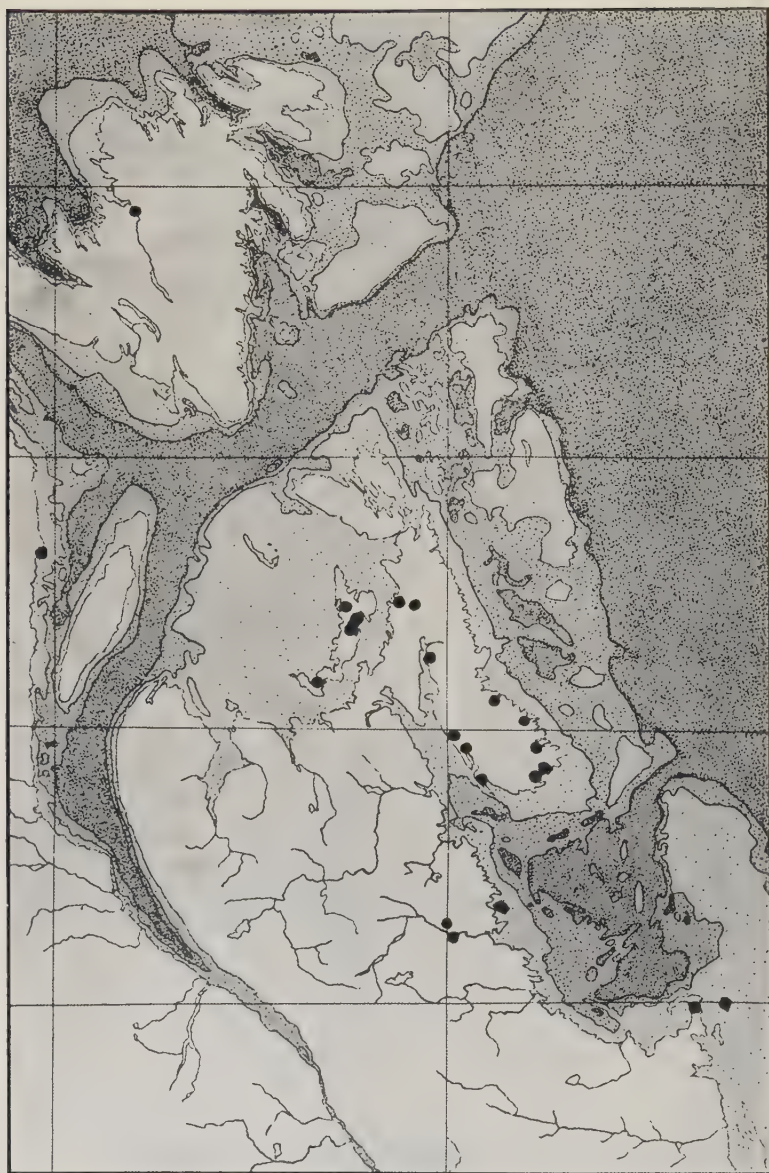
Antennaria rupicola, originally described from Aroostook Co., Maine, was reduced by me to varietal rank in 1914 on the basis of the variable series from along the Exploits at Grand Falls; but material of the plant gradually accumulated from a broad and natural range across southern Canada (MAP 26) is thoroughly consistent, and a re-



Map 26. Range of *ANTENNARIA RUPICOLA*.

study of it, with the finding of the additional character of the receptacle used in the key, convinces me that it is a well defined northern species.

A. rupicola (MAP 26) ranges from Newfoundland and Anticosti Island to northern Maine, and Thunder Bay District, Ontario. Besides the Newfoundland material (cited above), I have seen the following. QUEBEC: talus calcaires des bords de la Rivière Macdonald, Anticosti, *Victorin, Rolland & Louis*, no. 21,328; sur les cailloutis secs à l'entrée, Riv. Macdonald, *Victorin & Rolland*, no. 27,616; detritus calcaires des talus secs, Riv. du Rénard, Anticosti, *Victorin & Rolland*, no. 27,614; wooded slope, St. Jean l'Évangéliste, Nouvelle, July 19 & 20, 1904, *Collins & Fernald*; ledgy banks of Restigouche River, Matapédia, July 19, 1904, *Collins & Fernald* (aberrant specimen bearing rosettes and supernumerary branches from the upper axils). MAGDALEN ISLANDS: dry clearing, Grindstone, Grindstone Island, *Fernald, Bartram, Long & St. John*, no. 8175 (distributed as *A. neodioica*). NEW BRUNSWICK: open field, Campbellton, July 8, 1878, *Chalmers* (herb. Brit. Mus.). MAINE: ledgy shores and rocky banks (calcareous-slate ledges), Island Falls, *Fernald*, no. 2361 (TYPE), *Fernald* in Pl. Exsicc. Gray, no. 37, *Pease*, no. 2251. ONTARIO: yellow clay soil along Onaman River, Thunder Bay Distr., 1912, *H. E. Pulling*; rocks, Port Arthur, *C. S. Williamson* (herb. Phil. Acad.). MICHIGAN: Isle Royale, *Cooper*, no. 50.



Map 27. Range of *Antennaria petaloidea*, var. *subcorymbosa*.

15. *A. NEODIOICA* Greene, Pittonia, iii. 184 (1897).—In Newfoundland three varieties may be recognized:¹

a. Rosette-leaves gray-tomentose above....*b.*

b. Outer and middle bracts of pistillate heads obtuse.....Var. *typica*.

b. Outer and middle bracts attenuate.....Var. *attenuata*.

a. Rosette-leaves bright-green and glabrous above.....Var. *chlorophylla*.

Var. *typica*. *A. neodiodia* Greene, l. c.; Fernald, Proc. Bost. Soc. Nat. Hist. xxviii. 244 (1898); Robinson & Fernald in Gray, Man, ed. 7: 822, fig. 982 (1908).—In Newfoundland known only from the southeastern half of the Island: 10 miles south of St. John's, July, 1902, *L. L. Dame*; rocky soil, along Rennie's River, near St. John's, July 12, 1902, *Dame*; rocky clearing, St. John's, *Fernald & Wiegand*, no. 6357; Murray's Pond, 1928, *A. M. Ayre*; dry ledgy slope, Killigrew's, *Fernald & Wiegand*, no. 6358; rocky hills and gravel, ledges and talus along Exploits River, Grand Falls, *Fernald, Wiegand, Bartram & Darlington*, nos. 6359–6361; dry soil, Millertown, July 11, 1930, *Jansson*; rocky river-shore and dry woods, Buchan Junction, July, 1930, *Jansson*. A widely distributed species, from southern Newfoundland to Ontario, south to Virginia, Indiana and Wisconsin.

Var. *ATTENUATA* Fernald, Proc. Bost. Soc. Nat. Hist. xxviii. 248 (1898).—More general in range: Murrays Pond and Placentia, 1928, *A. M. Ayre*; sandy terraces of Exploits River, Bishop Falls, *Fernald, Wiegand & Darlington*, no. 6356; sandstone ledges and talus, Grand Falls, *Fernald, Wiegand, Bartram & Darlington*, nos. 6350–6355; turfy limestone crest (alt. 650 m.), Killdevil, Main Arm, Bonne Bay, *Fernald, Long & Fogg*, no. 2111; bare spots on peaty and gravelly slopes, French (or Tweed) Island, Bay of Islands, *Fernald, Long & Fogg*, no. 465; dry gravelly slope, Lark Harbor, Bay of Islands, *Fernald, Long & Fogg*, no. 464 (the last two erroneously distributed as var.

¹ Two other well marked varieties are as yet not known from Newfoundland:

Var. *GRANDIS* Fernald, RHODORA, i. 73 (1899). *A. grandis* House, Bull. N. Y. State Mus. no. 188: 60, 63 (1916), without statement of the specific characters. The largest extreme, with rosette-leaves 7–17 mm. broad; cauline leaves 7–14, mostly broader and longer than in the other vars.; bracts of the involucre (except in forms from deep shade) reddish below, white-petaloid above: corolla and style 5.5–6.2 mm. long.—Nova Scotia and southern New Brunswick to southern Quebec and Michigan, south to Massachusetts and New York.

Var. *interjecta*, var. nov., caulibus humifusis repentibus rigidis subligneis; foliis basilariibus rosulatis oblanceolatis vel anguste obovatis acutis vel subacutis basi subcuneatis supra griseis 3–7 mm. latis; caule florifero erecto vix flexuoso 0.5–2.5 dm. alto; foliis caulinis 8–14 subapproximatis vel vix distantibus; corymbis subglomerulatis globosis vel hemisphericis 1.5–3 cm. diametro; involucri bracteis scariosis linearibus vel lineari-lanceolatis attenuatis stramineis vel albidovirescentibus.—Gaspé and Rimouski Counties, QUEBEC: dry gravelly woods, banks of Grand River, Gaspé Co., June 30–July 3, 1904, *Fernald*; dry fir woods at base of limestone-conglomerate cliffs, west of Baptiste Michaud's, Bic, Rimouski Co., July 16, 1904, *Collins & Fernald* (TYPE in Gray Herb.); sandy field, Anse aux Bouleaux, Bic, *Fernald & Collins*, no. 777; newly seeded field, 1½ miles west of village, Bic, June 22, 1905, *F. F. Forbes*; dry hillside north of Bic, June 23, 1905, *Forbes*; dry bank by Anse à l'Original, Bic, June 27, 1905, *Forbes*; sur les schistes dénudés, Pointe du Vieux Bic, *Rousseau*, nos. 26,454, 26,639; sur les schistes, Cap à l'Original, Bic, *Rousseau*, no. 26,706; sur les schistes dénudés, Ile du Bic, *Rousseau*, no. 26,848.

Var. *interjecta* has the habit of *A. rupicola*, and the narrow and scarcely petioled, acute rosette-leaves, the numerous and scarcely distant cauline leaves, and the dense subglomerulate corymb of that species; but its scarious involucre bracts are like those of *A. neodioica*, var. *attenuata* and its receptacles have the large and deep pits of *A. neodioica*.

gaspensis); dry exposed calcareous cliffs, Steady Brook Falls, lower Humber River, *Fernald & Wiegand*, no. 4142. The variety has a broad range similar to that of var. *typica*. See p. 89.

Var. *CHLOROPHYLLA* Fernald, *RHODORA*, xxiii. 296 (1922).—Local: rocky river-shore, Buchan Junction, *Jansson*; dry gravelly slope, Lark Harbor, Bay of Islands, *Fernald, Long & Fogg*, no. 462 (erroneously distributed as *A. spathulata*); St. George's, *Mackenzie & Griscom*, no. 11,142.

Var. *chlorophylla* ranges from western Newfoundland and Antocosti Island to Nova Scotia, New England and New York.

16. *A. PETALOIDEA* Fernald, var. *SUBCORYMBOSA* Fernald, *RHODORA*, xvi. 133 (1914). *A. neglecta*, var. *subcorymbosa* Fernald, *Proc. Bost. Soc. Nat. Hist.* xxviii. 246 (1898).—Very rare in Newfoundland: sandy terraces of Exploits River, Bishop Falls, *Fernald, Wiegand & Darlington*, no. 6363. A coastwise variety (MAP 27) of the more widely ranging *A. petaloidea*, occurring from east-central Newfoundland, the lower Natashquan (Saguenay Co., Quebec), Prince Edward Island and Nova Scotia to Nantucket Island and Cape Cod, Massachusetts.

**HELIANTHUS GIGANTEUS* L., var. *SUBTUBEROSUS* (Bourgeau) Britton. A few plants with obvious weeds on a pastured slope, Lark Harbor, BAY OF ISLANDS, *Fernald, Long & Fogg*, no. 470.

This plant of the north central United States and adjacent Canada is becoming a frequent weed in the East.

ARTEMISIA BOREALIS Pall.

As pointed out in *RHODORA*, xxix. 93 (1927) we have three varieties of *Artemisia borealis* in Newfoundland. They are, apparently, confined to the West Coast.

A. BOREALIS (typical). BONNE BAY: talus of limestone cliffs near Stanleyville, *Fernald, Long & Fogg*, no. 2121. PORT AU PORT BAY: dry limestone barrens, Table Mt., *Fernald, Wiegand & Kittredge*, no. 4164.

A. BOREALIS, var. *PURSHII* Besser. ST. JOHN BAY: dry gravelly limestone barrens, St. John Island, *Fernald, Wiegand, Long, Gilbert & Hotchkiss*, no. 29,203. PORT AU PORT BAY: dry exposed ledges and shingle on the limestone tableland, Table Mt., *Fernald & St. John*, no. 10,871, *Mackenzie & Griscom*, no. 10,476. CAPE ST. GEORGE: limestone barrens, Green Gardens, *Mackenzie & Griscom*, no. 11,079.

A. BOREALIS, var. *LATISECTA* Fern. l. c. (1927). BONNE BAY: shelves and talus of diorite cliffs, Western Head, *Fernald, Long & Fogg*, no. 2122. BAY OF ISLANDS: talus of sea-cliffs, French (or Tweed) Island, *Fernald, Long & Fogg*, no. 476 (TYPE); turf spots on slaty calcareous talus, Cutwater Head, no. 2120. See p. 7.

(To be continued.)

ON THE DISTRIBUTION OF *SOROCARPUS*.—In *RHODORA*, Vol. I., p. 127, July, 1899 Frank S. Collins reported that Miss Colt had collected *Sorocarpus wuaeformis* (Lyngb.) Pringsh. along the coast of Marthas Vineyard. Probably referring to this collection, he also recorded its occurrence in Southern Massachusetts in his list of New England Marine Algae which appears in *RHODORA*, Vol. II., pp. 41–52, February, 1900. More than thirty years ago I collected it sparingly in Vineyard Sound and in Narragansett Bay. It occurs also in the North Sea at Helgoland and at several stations in the Baltic. According to De Toni, *Sylloge*, Vol. III., p. 569, Hariot found it along the Miquelon Islands off Newfoundland. But despite this wide distribution it is exceedingly scarce everywhere, and only a few filaments will be found intermingled with *Ectocarpus confervoides* or *E. siliculosus*. It is therefore with decided pleasure that I record its collection along an exposed shore at North Brooklin, Maine, on May 16, 1933. It should be sought in late winter or early spring, as it is an annual and seems to disappear when its fruiting season has passed.

It is said to vary much in size. The specimens I saw from Southern New England were rather small and slender; and, if memory serves me correctly, seemed to trend toward the variety *balticus* of Reinke. The specimen from Maine is darker and more robust, reaching the height of about three inches.

Slides will be deposited in the Farlow Herbarium and the National Herbarium.—R. E. SCHUH, Brooklin, Maine.

NOTES ON ROCKY MOUNTAIN PLANTS.

ATRAGENE COLUMBIANA Nutt., f. *albescens* f. nov. formae typicae similis sed sepalis albis.—COLORADO: Rocky Mountain National Park, Fall River, near Cascade Lodge, alt. 8,300 ft., June 16, 1933. *E. H. & L. Kelso* 40 (TYPE, in my collection).

Sepals pure white, otherwise similar to the species.

Clematis occidentalis var. *albiflora* Cockerell, Bot. Gaz. 29: 281. 1900, is a form of *Atragene pseudoalpina* (Kuntze) Rydb.

ERIOGONUM ANNUUM Nutt., f. *roseum* f. nov. Sepala laete rosea.—COLORADO: Aurora, plains 2 miles north, September 18, 1929. *L. Kelso* 1316 (TYPE, in my collection).

With the species; sepals bright pink.

Many specimens of this form were seen and collected. The bright roseate color does not fade to the brownish tint often seen on herbarium specimens.

LEUCOCRINUM MONTANUM Nutt., var. **fibrosum**, var. nov. Formae typicae similis sed radix cum fibris crispis conspicuis.—NEVADA: "form" near Oreana, Humboldt Valley, alt. 4,500 ft. June, 1868. *S. Watson* 1177; Winnemucca, May 17, 1917, *Wooton*; Paradise Valley, Humboldt Co., Apr. 30, 1905, *P. B. Kennedy* 1047 (TYPE, in U. S. National Herbarium).

Leaves more firm, strongly persistent on the rootstock as a mass of curled fibers; otherwise similar to the species.

Many young and old plants growing around Denver, Colorado, as well as material from other states show few or no fibers remaining from dead leaves. If present they are not strongly attached.—E. H. KELSO, Washington, D. C.

HETEROCHROMISM IN ARCTOSTAPHYLOS UVA-URSI, VAR. COACTILIS¹

M. L. FERNALD

ON October 9th, 1932, I had a group of students on the annual field-trip of "Botany 7" to Cape Cod. Visiting the eastern "fore-arm" of the Cape to show them the great boulderless downs carpeted with *Corema Conradii* Torr. and a fine assemblage of *Hudsonia* (*H. ericoides* L., *H. tomentosa* Nutt. and the somewhat intermediate but more northern *H. tomentosa*, var. *intermedia* Peck) interspersed with the characteristic broad carpets of *Arctostaphylos Uva-ursi*, var. *coactilis* Fern. & Macbr. RHODORA, xvi. 212 (1914), I decided to extend the trip into the northeastern corner of Wellfleet, in order to exhibit the well-known station² there of *Opuntia humifusa* Raf. (*O. vulgaris* of Gray's Man. not Mill.).

Walking through the dry pitch pine woods, one of the students, Mr. George B. Rossbach, picked a flowering sprig from the Bearberry, with vivid carmine to purple slender flowers. I had grown hardened to the discovery of unusual plants on the Cape, but when further search showed that many of the carpets of *Arctostaphylos* in this part of Wellfleet were bearing abundant October inflorescences of these bright red slenderly barrel-shaped or subcylindric flowers, the amazement of the entire party can be imagined. On October 13, I returned with Mr. Charles Bullard and my son, Henry G. Fernald, to Wellfleet and collected for the *Plantae Exsiccatae Grayanae* 110 sheets of flowering material, and still later, at the end of the month, visiting Wellfleet with a class of Radcliffe students, we found the

¹ Published with aid to RHODORA from the National Academy of Sciences.

² See F. S. Collins, RHODORA, xvi. 102 (1914).

carmine or "Pomegranate purple" or "Bordeaux" (of Ridgeway) flowers still abundant in the woods and in half-shade. On the open sands the red autumnal flowers were shriveled but in the woods and their openings they were apparently going to linger until winter.

On the trip with Mr. Bullard and my son we found a few (but very few) whitish or pale-pink urceolate and comparatively short flowers such as abound in April and May. These were on plants which bore in abundance the slender and longer red or purple flowers and sometimes the two colors and forms were found in a single inflorescence. This anomalous situation clearly disposed of any temptation to treat the novel autumn-flowering plants as a new species; it was evident that we were dealing with heterochromism in individual plants. On October 13th, Mr. Bullard, my son and I traced the red-flowered colonies southward at least to Eastham. South and west of there (on the central Cape and in Plymouth) we found no such flowers, nor were they seen in the many colonies of *Arctostaphylos* in north-eastern Massachusetts.

On May 9, 1933, returning to the marked colony at Wellfleet, where in mid-October we had secured more than 100 sheets of red-flowering specimens, my son and I found the same carpets heavily loaded with the ordinary vernal broadly urceolate white to pale-pink flowers. So abundant were these as to whiten the patches, but interspersed with the abundant white to pale-pink inflorescences there were few and scattered vivid red ones quite like those of the late autumn but smaller, the slenderly subcylindric corollas strongly contrasting in size and shape, as well as color, with the abundant pale vernal flowers.

We hoped that the two colors were on separate plants and for a time this seemed to be the case, but soon we found the two strongly contrasted colors on identical branches and in some cases mixed in single inflorescences, while very rarely the red flowers approached in size and shape the urceolate whitish ones. On this trip we stopped midway in the township of Yarmouth (about 1 mile south of Bass River station) and the first patch of *Arctostaphylos* we looked at had one red inflorescence among the abundant whitish ones, but search revealed very few others.

Stopping on our return to Cambridge, at the Arnold Arboretum, we showed the spring collection to Mr. Alfred Rehder. His first response, on seeing only the slender red corollas, was the inevitable one, "surely a new species"; but upon seeing the plants with both

types of flowers his astonishment was as great as my own had been. Living branches were left with Mr. Rehder for cultivation at the Arnold Arboretum; others have been given to Miss Louisa Hunnewell; another has been placed in a bed of sand from the original station where I can personally watch it and we should know in another season whether these plants from Wellfleet regularly produce two types of inflorescences.

Dissection of flowers from the two types shows no structural differences: the anthers, stigmas and ovaries seem identical; but as yet we have no indication whether the two are equally fertile. As already stated, the red flowers, when fresh, commonly match the carmine or the "Pomegranate purple" of Ridgeway, but many of them are deeper or darker in color, approximately the "Bordeaux" of Ridgeway. Mrs. C. A. Weatherby most kindly made a water-color sketch of fresh carmine flowers now preserved at the Gray Herbarium; and my son has made color-plates by photography to preserve the original colors of the more purple tones. In drying the red or purple flowers tend to darken.

From our present knowledge the form of *Arctostaphylos Uva-ursi*, var. *coactilis* with abundant autumnal red or deep-purple flowers is apparently common on outer or "Lower" Cape Cod, especially in Wellfleet, becoming scarce westward, at least to Yarmouth; but on the "Upper Cape" it is unknown and it has not been found on the mainland of Massachusetts. Whether it is actually restricted to Cape Cod or whether it is of wider occurrence can be determined only by autumnal observation of colonies elsewhere in the range of var. *coactilis*. As a highly notable form this plant may be called

ARCTOSTAPHYLOS UVA-URSI (L.) Spreng., var. COACTILIS Fern. & Macbr., forma **heterochroma**, f. nov., formae typicae simillima differt corollis florum autumnalium saepe carmino-rubris vel purpureis subcylindricis gracilibus et corollis florum vernalium plerisque albis vel pallide roseis urceolatis rariter rubro-purpureis elongatisque. —MASSACHUSETTS: abundant in open sandy woods, Wellfleet, October 9, 1932, G. B. Rossbach, M. L. Fernald et al. (TYPE in Gray Herb.), Oct. 13, 1932, M. L. Fernald, Chas. Bullard & H. G. Fernald in Pl. Exsicc. Gray., May 9, 1933, M. L. & H. G. Fernald; dry sandy pine woods, North Eastham, October 13, 1932, Fernald, Bullard & Fernald; dry sandy pine woods, Yarmouth, May 9, 1933, Fernald & Fernald.

GRAY HERBARIUM.

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ANTENNARIA CONFUSA (left), $\times 1$; A. GASPENSIS (right), $\times 1$; inserts $\times 2$.

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